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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/682,534	10/10/2003	Erik Berger	Q77248	9727

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EXAMINER	
LAXTON, GARY L	
ART UNIT	**PAPER NUMBER**
2838	

DATE MAILED: 01/21/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

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Office Action Summary	**Application No.** 10/682,534	**Applicant(s)** BERGER ET AL.
	Examiner Gary L. Laxton	**Art Unit** 2838

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 January 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-15* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *11-14* is/are allowed.

6)☒ Claim(s) *1-10 and 15* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed 01/07/05, especially with respect to the Yan reference, have been fully considered and are persuasive. Therefore, the rejections concerning the combination of references with the Yan reference has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of the fact that the combination of Gu et al and the Oldenkamp disclose the claimed invention without the Yan reference as stated infra.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1-10 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gu et al (US 5,907,223) in view of Oldenkamp (US 6,151,234).

Claim 1; Gu et al figure 9, discloses generating an AC output voltage comprising: pulse-width modulating a DC input voltage at a higher switching frequency than a system frequency (25-500 KHz) to produce a first pulse train and a second pulse train (figure 13: Q1 & Q2), each pulse train is modulated to correspond to one half-cycle of the AC output voltage to be generated (figure 13 & figure 14), and the pulse trains are shifted out of phase; applying the first pulse train and the second pulse train to a primary winding (Np1, Np2) of a transformer (T) to generate a third pulse train having opposite polarities; rectifying the pulses (D7-D10) of the third pulse train as output from the secondary winding of the transformer to produce a fourth pulse train of one polarity, pulses of the pulse train corresponding to successive half-cycles of the AC output voltage to be generated (figures 13 &14); wherein an output pulse train is obtained which is a pulse modulated representation of the AC output voltage with respect to amplitude, frequency and polarity (figures 13 & 14).

However, Gu et al do not teach reversing the pulse train at twice the frequency of the AC output voltage to be generated.

Oldenkamp teaches switching frequency of the switches in the unfolding bridge (3) is twice the frequency of the ac output voltage, which is usually 50 Hz or 60 Hz, so that the switching losses of the unfolding bridge (3) are negligible, due to the relatively low frequency.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Gu et al and Oldenkamp to provide a highly efficient output inverter that periodically reverses the polarity of a plurality of successive pulses, as taught by Gu et al, at twice the frequency of the AC output voltage to be generated, as taught by Oldenkamp, in order to provide a low frequency AC output voltage with switching losses of the inverter bridge being negligible, thereby increasing the efficiency of the power supply by reducing the switching losses.

Claim 2; Gu et al figure 9 discloses the primary winding of the transformer is split into two halves, and wherein the applying the first pulse train and the second pulse train to the primary winding of the transformer comprises applying the first pulse train to a first half of the primary winding, and with a reverse polarity, applying the second pulse train to a second half of the primary winding.

Claim 3; Gu et al teach a filter at the output of the converter (Lr, Cr).

Claim 4; Gu et al discloses the primary winding of the transformer is split into two halves, and wherein the applying the first pulse train and the second pulse train to the primary winding of the transformer comprises applying the first pulse train to a first half of the primary winding, and with a reverse polarity, applying the second pulse train to a second half of the primary winding.

Claim 5; Gu et al discloses a voltage converter for converting a DC input (Vin) into an AC output voltage (60) comprising a drive circuit (figure 9) that drives first and second switching devices (Q1, Q2), transformer (T), the switching devices are operated at a higher switching frequency (25-500 kHz) than a frequency of the AC output voltage (25-50 kHz); first and second square wave pulse trains of opposite polarity are applied to the primary winding (Np1, Np2) to output a third pulse train having pulses of opposite polarities (secondary winding Ns), the pulse trains are modulated to correspond to successive half-cycles of the AC output voltage to be generated (figure 13); the first and second pulse trains are shifted out of phase; rectifier (D7-D10) for rectifying the third pulse train (from secondary Ns) and outputting a fourth train of same polarity pulse (hence the rectifier) and correspond to successive half-cycles of the AC output voltage to be generated (figures 13 &14); and a controlled polarity reversal switch (62) for outputting a fifth pulse train which is a pulse width modulated representation of the AC output voltage with respect to amplitude, frequency and polarity.

However, Gu et al do not teach reversing the pulse train at twice the frequency of the AC output voltage to be generated.

Oldenkamp teaches switching frequency of the switches in the unfolding bridge (3) is twice the frequency of the ac output voltage, which is usually 50 Hz or 60 Hz, so that the switching losses of the unfolding bridge (3) are negligible, due to the relatively low frequency.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Gu et al and Oldenkamp to provide a highly efficient output inverter that periodically reverses the polarity of a plurality of successive pulses, as taught by Gu et al, at twice the frequency of the AC output voltage to be generated, as taught by Oldenkamp, in order to provide a low frequency AC output voltage with switching losses of the inverter bridge being negligible, thereby increasing the efficiency of the power supply by reducing the switching losses.

Claims 6-8; Gu et al teach a filter (Lr, Cr) for filtering the fifth pulse train. The filter includes an inductance and inductive load (60).

Claims 9 and 10; Gu et al figure 9 discloses the primary winding of the transformer is split into two halves, and wherein the applying the first pulse train and the second pulse train to the primary winding of the transformer comprises applying the first pulse train to a first half of the primary winding, and with a reverse polarity, applying the second pulse train to a second half of the primary winding. The polarity reversal switch comprises a bridge circuit having a controlled switch in each of its four arms.

4. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gu et al (US 5,907,223) and Oldenkamp (US 6,151,234) in view of McMurray (US 3,517,300).

Gu et al and Oldenkamp disclose the claimed subject matter in regards to claim 5 supra, except for the controlled polarity reversal switch and the first and second switching devices are controlled with the same controller.

McMurray teaches driving first and second switching devices (13, 15) and a polarity reversal switch (16, 17) with the same controller (24).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Gu et al and Oldenkamp to use only one controller to control the first and second switching devices and a polarity reversal switch as taught by McMurray in order to reduce the size of the circuit and conserve value circuit space as well as reduce manufacturing costs by using only one controller instead of two controllers.

Allowable Subject Matter

5. Claims 11-14 are allowed for the same reasons stated in the previous office action dated 4/22/04.

Conclusion

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL.** See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gary L. Laxton whose telephone number is (571) 272-2079. The examiner can normally be reached on Monday thru Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Sherry can be reached on (571) 272-2084. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

1/13/05

Gary L. Laxton
Patent Examiner
Art Unit 2838